TOPIC: INTRODUCTION TO FIRING TECHNIQUES AS APPLIED FIRE BEHAVIOR

TIME FRAME: 1:00

LEVEL OF INSTRUCTION: Level I

BEHAVIORAL OBJECTIVE:

Condition: Given a written quiz

Behavior: The student will confirm knowledge of firing techniques as applied fire behavior

Standard: With a minimum 80% accuracy according to the information contained in the lesson plan.

MATERIALS NEEDED:

- Writing board with markers/erasers
- Appropriate audiovisual material/equipment

REFERENCES:

- Fire Line Handbook, 410-1 NWCG
- Fire Weather, NFES 1174, NWCG
- RX 230 Ignition Operations, NWCG
- C-234 Intermediate Firing Operations, CAL FIRE, 2009
- S-290, Intermediate Wildland Fire Behavior, NWCG, 2007

PREPARATION: To effectively conduct firing operations the firefighter must have a clear understanding of basic fire behavior. You must also understand the effects your operation will have on the behavior of the fire. Employment of proper techniques for the conditions present is critical to your safety, the safety of others and the success of the operations.

PRESENTATION	APPLICATION
	SLIDE: 3-1-1
	SLIDE: 3-1-2
I. TERMINOLOGY	
A. Burnout	
1. Setting fire inside a control line to consume fuel between the edge of the fire and the control line, creating blackline	
B. Backfire	
1. A fire set ahead of the main fire with the expectation it will influence and/or be influenced by the main fire – set with the intent of slowing, stopping, or redirecting the spread of the main fire	
a) Usually but not necessarily lit within a control line	
	SLIDE: 3-1-3
C. Burn zone	
1. Removal of flammable fuels by creating a burn zone (Black Line) along desired perimeter outside of the fire's edge	
	SLIDE: 3-1-4
2. The rule of thumb for a burn zone width is a minimum of 4 times the average flame length	
NOTE: CAL FIRE's definition of backfire differs from NWCG.	
	SLIDE: 3-1-5
II. PRESENT AND PREDICTED FIRE BEHAVIOR INFLUENCES	

PRESENTATION	APPLICATION
A. Consider the total fire behavior situation	
1. Obtain and maintain the big picture	
a) Monitor for increased fire activity on other portions of the fire	
b) Monitor convection column	
	SLIDE: 3-1-6
c) Spotting activity	
1) Frequency	
2) Distance	
3) Intensity	
4) Fire brand sources and production	
• Torching crown foliage is a common source of fire brands	
	SLIDE: 3-1-7
2. Consider possible changes in the main fire's behavior as a result of your firing operation	
3. Consider how your firing operation will affect other operations on the fireline	
	SLIDE: 3-1-8
4. Be alert to changes in fire behavior as conditions or line orientation changes	
	SLIDE: 3-1-9
III. FIRE BEHAVIOR AS IT RELATES TO BASIC FIRING PATTERNS	
	SLIDE: 3-1-10

PRESENTATION	APPLICATION
A. Types of fire spread resulting from applied fire behavior	
1. Head	
a) Fire spreading with the wind and/or slope	
1) Described as “flames bending over unburned fuels”	
2. Backing fire	
a) Fire spreading against the wind and/or slope	
1) Described as “flames bending over blackened fuels”	
3. Flanking	
a) Fire that spreads at right angles (perpendicular) to the wind and slope	
	SLIDE: 3-1-11
	SLIDE: 3-1-12
	SLIDE: 3-1-13
	SLIDE: 3-1-14
B. Firing patterns	
1. Firing patterns will result in one or more of the three types of fire spread	
2. Patterns are described by orientation relative to the control line	
	SLIDE: 3-1-15
3. Edge or perimeter firing	
a) Set along the edge of control line	

PRESENTATION	APPLICATION
1) When conducted with favorable wind or slope • Head fire will result • Fast burnout times • May generate large amounts of heat • May lead to control problems if conditions change	**SLIDE: 3-1-16**
2) When conducted against wind or slope • Backing fire will result • Slow burnout time • Low heat generation • Possibility of spotting across line • May not achieve desired results in time available	**SLIDE: 3-1-17** **SLIDE: 3-1-18**
4. Strip Firing **NOTE:** Number of igniters may vary depending on conditions a) Strips of fire set parallel to and interior of the control line 1) When slope or wind are not favorable (1, 2, 3)	

PRESENTATION	APPLICATION
• Head fire toward control line • Backing fire toward main fire 2) When slope or wind are favorable (3, 2, 1) • Head fire toward main fire • Backing fire toward control line b) Works best in light flashy fuels c) Rate of firing and depth of strips are varied to control fire intensity	**SLIDE: 3-1-19** **SLIDE: 3-1-20** **SLIDE: 3-1-21** **SLIDE: 3-1-22**
5. Spike firing a) Lines of fire set into the influence of the wind or slope 1) Results primarily in a flanking fire 2) Used to increase rate of consumption without creating head fire	**SLIDE: 3-1-23** **SLIDE: 3-1-24** **SLIDE: 3-1-25**
6. Dot firing	

PRESENTATION	APPLICATION
a) Similar to strip firing using dots of fire instead of a strip b) Dots will interact with each other c) Decreases fireline intensity compared to strip fire	**SLIDE: 3-1-26** **SLIDE: 3-1-27** **SLIDE: 3-1-28** **SLIDE: 3-1-29**
7. Interior lit fires a) To be used with caution b) Accelerates burnout time c) Useful when travel is difficult d) Can be used to decrease or increase intensity based on application	**SLIDE: 3-1-30** **SLIDE: 3-1-31**
8. Wet-line / Foam-line a) Control fire edge with water or foam 1) Water / foam precedes fire b) Allows control of fire, but the fire may burn through the control line later 1) Water / foam follows fire c) Allows complete extinguishment	

PRESENTATION	APPLICATION
d) Do not overextend the distance between nozzle and lighter	
e) Open fire between the lighter and nozzle has potential to escape	
	SLIDE: 3-1-32
	SLIDE: 3-1-33
f) Caution – when wet-line firing the engine will be in the green!	
g) When wind/slope is against the side you are holding	
9. Try combining pre-wetting and a follow-up hose line (2 lines)	
	SLIDE: 3-1-34
	SLIDE: 3-1-35
	SLIDE: 3-1-36
	SLIDE: 3-1-37
	SLIDE: 3-1-38
	SLIDE: 3-1-39
10. Try something else when winds are strong	
a) Nozzle must be close enough to control fire as soon as the fire widens enough to allow one edge to be extinguished	
11. Do not overextend the distance from lighter to nozzle	
	SLIDE: 3-1-40
C. Combined ignition patterns	

PRESENTATION	APPLICATION
1. Basic ignition patterns are often combined to achieve desired results, example: a) Use edge fire to buffer control line b) Spike fire to deepen burn zone c) Strip fire into burn zone to widen it rapidly	**SLIDE: 3-1-41**
D. Table of firing techniques and resulting fire behavior	
NOTE: Discuss table with students.	

SUMMARY:

Applied fire behavior is a basic and critical component of firing operations. Weather, fuel, and/or topography often dictate time available for and location of firing operations. It is important for firefighters to understand and select the appropriate firing pattern. Strip, spike, dot, or interior lit firing may be used and utilized in combination to achieve the desired results.

EVALUATION:

The student will complete a written quiz at a time determined by the instructor.

ASSIGNMENT:

Review your notes and study for the upcoming quiz.